

RETRACTABLE LEASH ASSEMBLY WITH A
QUICK CONNECT COUPLING ASSEMBLY

1 BACKGROUND OF THE INVENTION

2 Claim of Priority

3 This is a continuation-in-part application of presently
4 pending U.S. Patent Application Serial No. 10/371,028 filed on
5 February 20, 2003, which is a continuation in part of U.S.
6 Patent Application 09/867,338 filed on May 29, 2001, now U.S.
7 Patent No. 6,629,511, which is a continuation-in-part of U.S.
8 Patent Application Serial No. 09/195,965 filed on November 19,
9 1998, now U.S. Patent No. 6,247,427, which is a continuation-in-
10 part of U.S. Patent Application Serial No. 08/958,111 filed on
11 October 27, 1997, now abandoned, which claims priority under 35
12 U.S.C. 119(e) to provisional patent application having Serial
13 No. 60/029,573 having a filing date of October 28, 1996, each of
14 which are incorporated by reference in their entirety herein.

15
16 Field of the Invention

17 The present invention is directed to a retractable leash
18 assembly including a quick connect coupling assembly having
19 first and second coupling components structured to be easily
20 aligned into position for connection by a handler with a single
21 hand and to be released either via an activation assembly
22 positioned a spaced distance from the coupling assembly, or by
23 a manual release mechanism. The quick connect coupling assembly

1 of the present invention includes an electromotive release
2 structure to facilitate positioning one or more locking members
3 between a locked orientation and an unlocked orientation. At
4 least one embodiment of the present invention also includes an
5 electromotive propulsion mechanism structured to facilitate
6 attachment and detachment of the first and second coupling
7 components with one another.

8 9 Description of the Related Art

10 It is widely known that there are millions of dog owners in
11 this country as well as other countries throughout the world.
12 Dogs comprise one of the most popular types of animals for
13 household pets. Of course, dogs are extremely popular animals
14 for other than simple companionship. Other uses of dogs include
15 working dogs and show dogs. In turn, working dogs may be
16 classified as dogs utilized for police enforcement purposes,
17 military activities, dogs trained for hunting and also dogs
18 specifically trained to aid those individuals who are visually
19 impaired.

20 Regardless of the above classifications, the care and
21 maintenance of dogs require the use of numerous auxiliary or
22 supplementary items. Among the most popular is the dog leash or
23 tethering assembly wherein dogs are retained and/or restricted
24 for purposes of control when not contained by fences in a yard
25 or like area. Moreover, similar type leash assemblies are also

1 useful on a variety of different animals including pets and farm
2 animals, such as horses.

3 It is also well recognized that leash structures, collars,
4 harnesses, etc. are available in numerous and varying designs
5 intended to control an animal for different purposes. Prior art
6 structures exist which comprise leash and collar combinations
7 specifically structured such that the length of a lead of the
8 leash assembly is selectively variable so that the dog or animal
9 being tethered may enjoy a greater range of movement and freedom
10 when the surrounding area allows. Alternately, the tethered
11 animal may be restrained, by shortening the length of the
12 extendable lead in areas which do not allow the free roaming of
13 the dog. Other prior art leash or tethering assemblies are
14 specifically designed to allow control and retention of the dog
15 or other animal while significantly reducing or eliminating the
16 tangling of the dog in the retaining harness and/or about an
17 anchoring structure to which the animal is tethered.

18 An area which is not currently addressed by leash and
19 retaining harness assemblies is the ability to quickly and
20 easily connect an animal to the leash assembly and to permit
21 release of the animal from a spaced distance from the animal,
22 such as a remote location. In the majority of conventional or
23 known leash assemblies, it is necessary for a handler to
24 manipulate a coupling structure utilizing both hands, wherein
25 the coupling structure serves to connect the distal end of the

1 lead to the collar or retaining harness mounted on the animal.
2 This generally involves direct handling or manipulation of any
3 one of a large variety of such coupling structures. Attachment
4 of the animal can be extremely difficult, particularly when the
5 dog or animal being tethered is overly frisky or otherwise in an
6 excited state. Also, in accomplishing either attachment or
7 detachment of the lead from the collar or like harness
8 particular problems are encountered by the elderly or by those
9 who are visually or otherwise physically challenged.

10 In addition to the above, the handling of larger animals,
11 such as horses and/or working dogs of the type trained to
12 conduct police enforcement and/or military activities, requires
13 that the animal be kept under control by the handler. However,
14 in cases of emergency, it is equally important that the animal
15 be released or detached from his controlling lead as quickly as
16 possible as it could be dangerous for the animal to begin
17 running while dragging the lead or any part of the leash
18 assembly. Conversely, if the animal is loose, it may be
19 necessary to quickly re-harness the animal in order to restrain
20 its movement in a hazardous situation.

21 A further problem is encountered in the handling, and in
22 particular, the transportation, of horses. Specifically, when
23 a horse is being confined in a trailer they often become anxious
24 and/or excited. Combined with the tight space limitations of
25 most trailers, the excited condition of the animal presents a

1 dangerous situation for the handler who must enter the trailer
2 to either attach or release the animal from the trailer. Thus,
3 it would be advantageous and potentially life saving for both
4 the animal and the handler to provide a means to remotely
5 release a horse that is attached to a trailer. At a minimum, it
6 would be advantageous to provide a remote, emergency release
7 activation mechanism on an exterior portion of the trailer, such
8 that the animal could be released without requiring the handler
9 to enter the trailer, which may cause the animal to become even
10 more anxious or excited.

11 Another area which the prior or related art does not
12 address is related to facilitating adjustment of the length of
13 the lead by the handler utilizing a retractable leash assembly.
14 In particular, although the prior art devices allow the length
15 of the lead, and thus, the distance between the animal and the
16 handler, or a fixed tethering location, to be adjusted, they do
17 not provide a means to align the lead for smooth and easy
18 retraction or release of the lead regardless of the relative
19 position of the animal to the handler or the tethering location.
20 More specifically, when the lead is extended a long distance,
21 the angle formed between the lead to the handler is quite
22 different than the angle formed when the animal is in close
23 proximity. Thus, the handler is forced to constantly adjust the
24 position of the device relative to the animal to prevent binding
25 of the lead with the housing of the device during retraction or

1 release of the lead to or from the handle, respectively.
2 Additionally, movement of the animal to the left or right of the
3 handler or tethering location may also increase the potential
4 for binding of the lead upon retraction or release of the lead
5 into or from the housing of the assembly. Nor does the prior
6 leash and/or tethering assembly art provide a means to lock the
7 lead in position relative to the assembly upon detection of a
8 specific release velocity or sudden acceleration of the lead
9 from the housing, as may occur when an animal becomes excited or
10 angry and bolts from the handler or the tethering location.

11 Accordingly, there is a recognized need in this area for a
12 leash or tethering assembly including a quick connect coupling
13 assembly having coupling components structured to easily align
14 into position for connection by a handler with a single hand.
15 It would also be preferable for such an assembly to allow
16 connection and release from an animal by the handler while in an
17 upright position, thereby eliminating the need for the handler
18 to bend over, such as may be inconvenient for elderly or infirm
19 handlers. Further, such a preferred leash or tethering assembly
20 should be structured to permit quick and effective detachment or
21 release of the animal via an activation assembly located a
22 spaced distance from the animal and the coupling component
23 serving to connect the animal harness to the lead. Preferably,
24 such an activation assembly may utilize mechanical, electrical,
25 and/or magnetic forces to facilitate the alignment and

1 interconnection of the coupling components. Further, it would
2 be beneficial for the activation assembly to utilize mechanical,
3 electrical, magnetic, electromagnetic, fiber optic, computer
4 generated, and/or remote voice activated signals to effect the
5 release of the coupling components of the leash assembly from
6 one another.

7 It would further be beneficial to provide a leash assembly
8 including wherein the activation assembly includes a lead
9 aligning mechanism structured to maintain the lead in position
10 relative to the housing of the activation assembly as the lead
11 is retracted and/or released into or from the housing,
12 respectively, to minimize binding of the lead with the housing.
13 Yet another desirable feature for such a leash assembly is a
14 release control mechanism to prevent unwanted release of a lead
15 upon sudden acceleration of the animal away from the handler or
16 tethering location, as may occur when an animal becomes excited
17 or angry.

18 Another disadvantage of the retractable leash assemblies of
19 the type commercially available is that they are typically
20 spring biased to the extent that a release mechanism allows a
21 free extension of the lead as the tethered animal travels a
22 greater distance from the handler. As such, in these known
23 devices, the lead cannot normally be retracted or rewound
24 without the handler first providing slack in the lead by
25 following or chasing the animal and thereby shortening the

1 distance between the handler and the animal prior to rewinding
2 the lead for storage. Therefore, it would also be desirable to
3 provide a leash or tethering assembly having a drive mechanism,
4 to facilitate the retrieval of an animal attached to the leash
5 assembly to the proximity of the handler or tethering location
6 without requiring the handler to traverse the distance between
7 themselves and the animal.

8 Further, while the foregoing discussion is directed to the
9 leash and tethering assembly art, it is envisioned that such a
10 quick connect coupling assembly as described herein will have
11 numerous other practical applications including, but not limited
12 to, tie downs for tools and equipment, securing luggage and/or
13 sporting equipment, temporary barrier devices, body harnesses,
14 and key chains, as well as in the area of robotics, including
15 integration into automated factory assembly line operations, and
16 remotely controlled devices utilized by military, law
17 enforcement, emergency, and rescue personnel, just to name few.

18 19 Summary of the Invention

20 The present invention relates to a leash assembly designed
21 to allow control of a dog or other animal by a handler and which
22 is structured to accomplish a quick detachment of the animal
23 from a remote position without requiring the direct handling or
24 manipulation of the quick connect coupling assembly serving to
25 interconnect the collar, harness, or similar attachment assembly

1 to the distal end of the lead. The present invention is also
2 designed and structured to provide a quick and efficient
3 attachment of a lead to an attachment assembly utilizing only a
4 single hand of the user or handler. More specifically, the
5 present invention comprises a flexible material lead being of
6 any appropriate or preferred length and terminating at a distal
7 end and an oppositely disposed proximal end. A preferably
8 rotating coupling component is connected, at least in part, to
9 the distal end of the lead and is specifically structured to
10 accomplish a quick and easy attachment of the lead to the
11 attachment assembly, as well as a quick release or detachment of
12 the lead from an attachment assembly mounted directly on the
13 animal being tethered.

14 In order to accomplish such quick release of the coupling
15 assembly, the present invention further comprises a release
16 structure preferably in the form of a release or positioning
17 cable formed of metallic or other applicable material having
18 sufficient structural integrity to be movable axially along its
19 own length and to exert an axially directed force on a coupling
20 assembly to be described in greater detail hereinafter. The
21 term "structural integrity" refers to the structural features of
22 the release cable being of a material with sufficient rigidity,
23 while still being flexible, to exert the aforementioned axially
24 directed force on the coupling assembly or otherwise structured
25 to be axially moveable along the length of the lead so as to

1 exert the aforementioned force on the coupling assembly and
2 thereby orient the coupling assembly in a disconnect position,
3 as will be explained in greater detailed hereinafter.

4 The release structure or cable is mounted on and preferably
5 within the interior of the lead and extends along the length
6 thereof between the aforementioned distal end and proximal end.
7 One end of the release cable is disposed adjacent the distal end
8 of the lead and is connected directly to the preferably rotating
9 coupling component. Selective axial movement of the release
10 cable causes a disconnection of the coupling components defining
11 the subject coupling assembly. The aforementioned quick release
12 is thereby accomplished from a location remote from the animal
13 without the necessity of directly handling or manipulating the
14 coupling assembly. Alternate embodiments of the present
15 invention include a coupling assembly comprising magnetically
16 attractive components, and a release structure comprising an
17 electromagnet whose polarity may be reversed to alternately
18 facilitate automatic attachment and detachment of the
19 components.

20 To accomplish the desired quick release, the present
21 invention also includes an activation assembly mounted adjacent
22 the proximal end of the lead and includes an activation member
23 connected directly to the correspondingly positioned end of the
24 release cable. Depending upon the various embodiments, to be
25 described in greater detail hereinafter, the activation member

1 may be disposed and configured for direct manipulation by a
2 thumb or finger of a single hand of a person gripping a handle
3 portion of the activation assembly which is connected to the
4 proximal end of the lead. By depressing or otherwise
5 manipulating the activation member, the release cable is forced
6 to move axially along its length relative to the lead on which
7 it is mounted. This movement will cause an axially directed
8 force to be exerted directly on at least one of the coupling
9 components of the coupling assembly and a disconnection of the
10 coupling assembly. A quick release and/or detachment of the
11 attachment assembly will thereby be effected. Additional
12 embodiments of the present invention include an electronically
13 operated activation assembly, which may or may not be radio
14 activated.

15 Another feature of one preferred embodiment of the leash
16 assembly of the present invention further includes an activation
17 assembly comprising a drive motor to be actuated by a user. The
18 drive motor is configured, such as by attachment to a storage or
19 take-up spool, to effectuate storage of the lead itself and/or
20 activation of the quick release structure.

21 An additional embodiment of the present invention includes
22 the coupling assembly structured to provide a quick attachment
23 and detachment of the distal, free end of the lead to the
24 attachment assembly mounted on the animal. In addition, an
25 similarly structured coupling assembly may be used to connect

1 opposite free ends of the attachment assembly to one another
2 around the animal in an intended fashion. In the aforementioned
3 coupling assembly, first and second components are structured so
4 as to be attached to one another in a manner which only requires
5 a single hand of the handler or user of the leash assembly of
6 the present invention. Quick and easy release of the two
7 components of the coupling assembly from one another is
8 accomplished by manipulation of the activation assembly and
9 movement of the release structure mounted within the lead, as
10 set forth above. More specifically, each of the components of
11 the present invention may be positioned into a predetermined
12 aligned engagement with one another such that a pushing force
13 exerted on the first and second components of the coupling
14 assembly will cause a quick and efficient attachment of the two
15 components to one another. Such quick attachment can be
16 accomplished without manipulation of a spring biased plunger
17 normally associated with generally known, swivel type coupling
18 assemblies. Further, the coupling assembly may include an
19 alignment assembly structured and disposed to facilitate the
20 aforementioned predetermined aligned engagement of the
21 components with one another. The alignment assembly preferably
22 comprises magnetic surfaces on each component of the coupling
23 assembly cooperatively disposed in engageable relation with one
24 another when the components are aligned.

25 It is an object of the present invention to provide a leash

1 assembly which is strong and secure, yet which also provides for
2 the quick and easy release of the animal restrained thereby.

3 A further object of the present invention is to provide a
4 leash assembly which is substantially easy to operate and does
5 not require direct user manipulation of a coupling assembly when
6 connecting the attachment assembly on the animal to a lead
7 associated with the leash assembly.

8 It is also an important object of the present invention to
9 provide a leash assembly structured to facilitate rapid and
10 efficient connection of an attachment assembly, mounted on the
11 animal, to a lead in a manner which requires minimal
12 manipulation and the use of only one hand of the animal handler.

13 Yet another object to the present invention is to provide
14 a leash assembly including a lead which may be retracted or
15 extended in a controlled manner whether or not the free end of
16 the lead is secured to the attachment assembly. It is also an
17 important object to the present invention to provide the leash
18 assembly, including the various operative components associated
19 therewith, which is formed from a light weight yet durable
20 material so as to be operable over an extended period and which
21 is structurally designed to be produced or manufactured
22 relatively inexpensively so as to make the present invention
23 available to a wide range of potential customers.

24 It is a further object of this invention to provide a quick
25 connect coupling assembly which may be utilized in a variety of

1 other connection applications. The need for a coupling assembly
2 permitting quick release and/or attachment exists in many
3 applications, for example, tie downs for equipment, tools, or
4 machinery, securing luggage and/or sporting equipment, temporary
5 barrier devices, body harnesses, and key chains. Thus, the
6 present invention provides such a quick connect coupling
7 assembly for the aforementioned applications, however, the
8 present invention may be utilized in numerous other connection
9 applications as may easily be envisioned.

10 These and other objects, features and advantages of the
11 present invention will become more clear when the drawings as
12 well as the detailed description are taken into consideration.
13

14 Brief Description of the Drawings

15 For a fuller understanding of the nature of the present
16 invention, reference should be had to the following detailed
17 description taken in connection with the accompanying drawings
18 in which:

19 Figure 1 is a perspective view in partial cutaway showing
20 the various structural features of one preferred embodiment of
21 the present invention.

22 Figure 2 is a sectional view of a lead of the leash
23 assembly of Figure 1.

24 Figure 2A is a sectional view of the lead of Figure 4.

25 Figure 3 is a detailed view showing another embodiment of

1 the present invention.

2 Figure 4 is a perspective view showing yet another
3 preferred embodiment of the present invention.

4 Figure 4A is a perspective view showing one alternate
5 embodiment of a lead of the present invention.

6 Figure 4B is a perspective view of another alternate
7 embodiment of a retractable leash assembly of the present
8 invention comprising a plurality of leads.

9 Figure 5 is a perspective view of another, preferred
10 embodiment of the present invention.

11 Figure 6 is a detailed view in partial cutaway and section
12 showing structural details of one preferred embodiment of a
13 quick connect coupling assembly of the present invention.

14 Figure 7 is a perspective view in partially exploded form
15 of another preferred embodiment of the quick connect coupling
16 assembly associated with the present invention.

17 Figure 8 is a front view in partial section of the
18 embodiment of Figure 7 in a connected position.

19 Figure 9 is a side view of yet another preferred embodiment
20 of an activation assembly associated with the leash assembly of
21 the present invention.

22 Figure 10 is an external, perspective view of yet another
23 embodiment of an activation assembly associated with the leash
24 assembly of the present invention.

25 Figure 11 is a perspective view showing interior structural

1 details of the embodiment of Figure 10.

2 Figure 12 is a side view of another embodiment of an
3 activation assembly of the present invention illustrating a lead
4 aligning mechanism.

5 Figure 13 is an end view of the activation assembly of
6 Figure 12 along lines 13-13 thereof.

7 Figure 14 is a partial cross-section view of the activation
8 assembly of Figure 12 along lines 14-14 thereof.

9 Figure 15 is a side view of the activation assembly of
10 Figure 12 illustrating another embodiment of a lead aligning
11 mechanism.

12 Figure 16 is an end view of the activation assembly of
13 Figure 15 along lines 16-16 thereof.

14 Figure 17 is a side view of the activation assembly of
15 Figure 12 illustrating another embodiment of a lead aligning
16 mechanism.

17 Figure 18 is an end view of the activation assembly of
18 Figure 17 along lines 18-18 thereof.

19 Figure 19 is a side view of the activation assembly of
20 Figure 12 illustrating another embodiment of a lead aligning
21 mechanism.

22 Figure 20 is an end view of the activation assembly of
23 Figure 19 along lines 20-20 thereof.

24 Figure 21 is a perspective view in partially exploded form
25 of another preferred embodiment of the quick connect coupling

1 assembly associated with the present invention illustrating a
2 voice activated control module.

3 Figure 22 is a side view of another embodiment of an
4 activation assembly of the present invention illustrating a lead
5 aligning mechanism.

6 Figure 23 is a perspective view of another embodiment of an
7 activation assembly of the present invention illustrating a lead
8 aligning mechanism.

9 Figure 24 is a perspective view of another embodiment of an
10 activation assembly of the present invention illustrating a
11 composite lead aligning mechanism.

12 Figure 25A is a partially exploded cross-sectional view of
13 one preferred embodiment of the quick connect coupling assembly
14 of the present invention comprising an electromotive release
15 mechanism and illustrating a pair of locking members in an
16 outwardly extending locking orientation.

17 Figure 25B is a partially exploded cross-sectional view of
18 the embodiment of Figure 25A illustrating the pair of locking
19 members in a retracted orientation.

20 Figure 26A is a partially exploded cross-sectional view of
21 another preferred embodiment of the quick connect coupling
22 assembly of the present invention incorporating an electromotive
23 release mechanism, specifically, a rotary solenoid, and
24 illustrating a pair of locking members in a retracted
25 orientation.

1 Figure 26B is a partially exploded cross-sectional view of
2 the embodiment of Figure 26A illustrating the pair of locking
3 members in an outwardly extending locking orientation.

4 Figure 26C is a partial cross-sectional plan view of the
5 first component of the embodiment of Figure 26B, along lines
6 26C-26C thereof.

7 Figure 27A is a partially exploded cross-sectional view of
8 another embodiment of the quick connect coupling assembly of the
9 present invention comprising a manual release mechanism and
10 illustrating a pair of locking members in an outwardly extending
11 locking orientation.

12 Figure 27B is a partially exploded cross-sectional view of
13 the preferred embodiment of Figure 27A illustrating the pair of
14 locking members in a retracted orientation.

15 Figure 28A is a partially exploded cross-sectional view of
16 one preferred embodiment of the quick connect coupling assembly
17 of the present invention comprising an electromotive release
18 mechanism and an electromotive propulsion mechanism illustrating
19 a pair of propulsion members disposed in a secured
20 configuration.

21 Figure 28B is a partially exploded cross-sectional view of
22 the embodiment of Figure 28A illustrating the pair of
23 propulsion members in a separated configuration.

24 Figure 29 is a partially exploded cross-sectional view of
25 one other embodiment of a quick connect coupling assembly having

1 an electromotive release mechanism comprising a propulsion
2 member.

3 Like reference numerals refer to like parts throughout the
4 several views of the drawings.

5
6 Detailed Description of the Preferred Embodiment

7 As shown in the accompanying Figures, the present invention
8 is directed towards a retractable leash assembly wherein a
9 preferred embodiment is disclosed in Figure 1 and includes a
10 lead as in 10 being of any applicable or desired length and
11 further being formed of a flexible material so as to facilitate
12 freedom of movement of both the animal and the handler or user
13 of the subject assembly, and to a quick connect coupling
14 assembly which includes a coupling assembly generally shown as
15 16, a release structure generally shown as 24, and an activation
16 assembly generally shown as 38, as disclosed herein.

17 The lead 10 terminates at a distal end 12 and a proximal
18 end 14, which are oppositely disposed relative to one another.
19 Moreover, a coupling assembly 16 is secured, at least in part,
20 adjacent the distal end 12 of the lead 10 and includes a first
21 component as in 18 and a second component as in 22. The first
22 component 18 may be secured to the distal end 12 of the lead 10
23 and is connected to a release structure which may be defined in
24 one embodiment by a release or positioning cable 24. With
25 further reference to the coupling assembly 16, the second

1 component 22 may be mounted on or attached to a collar, harness,
2 or similar attachment assembly as at 26 designed to be mounted
3 directly on the animal's body in the conventional fashion.
4 Alternatively, the second component 22 may be secured to a
5 distal end of a second lead structure as in a tie down assembly,
6 or it may be secured to a fixed structure. Opposite ends of the
7 attachment assembly 26 may define connectable portions and if
8 desired may be removably attached using a similar second
9 coupling assembly generally indicated as 28 similar in operation
10 to the coupling assembly 16 associated with the lead 10.
11 Moreover, the attachment assembly 26 itself may be integrated as
12 part of the present invention wherein the coupling assembly 28
13 incorporates specific structural improvements set forth in
14 greater detail hereinafter which provides a quick and efficient
15 attachment or coupling of opposite ends of the attachment
16 assembly 26. The second coupling assembly 28 of the present
17 invention also includes a first component 29 and a second
18 component 30 designed to be removably and quickly attached and
19 detached relative to one another so as to secure the attachment
20 assembly 26 about the neck of the dog or other animal being
21 tethered. Loop type connecting elements as at 32 may serve to
22 movably mount or attach the components 29, 30 of the second
23 coupling assembly 28 to the opposite ends of the attachment
24 assembly 26.

25 A loop type connector 32 may also serve to movably mount

1 the second component 22 of the coupling assembly 16 to the
2 attachment assembly 26 such that the entire coupling assembly 16
3 is allowed to move freely along the length of the attachment
4 assembly 26 in order to provide the animal more freedom when
5 connected to the lead 10 and also to reduce the possibility of
6 tangling of the attachment assembly 26 with the remainder of the
7 lead 10.

8 With reference to the embodiment of Figures 1 and 2, the
9 release structure which comprises release cable 24 in a
10 preferred embodiment, is preferably mounted within an interior
11 25 of an outer flexible material, such as lead 10, as
12 illustrated in Figure 2. The lead 10 may therefore assume a
13 generally tubular configuration so as to enclose the release
14 cable 24 in a hollow interior 25 thereof. Alternatively, as
15 illustrated in Figure 2A, a separate hollow sheath structure 27
16 may be provided and preferably secured to or embedded or
17 concealed within the lead 10'. The sheath structure includes a
18 hollow interior 25' and preferably extends along the entire
19 length of the lead 10' so as to enclose the release cable 24
20 therein along substantially its entire length. Such a
21 configuration is particularly beneficial in woven material lead
22 structures, or if the lead structure is to be wound, because
23 movement of the release cable 24 while in an at least partially
24 wound position is required. In the embodiment illustrated in
25 Figure 2A, the sheath structure 27 is configured to facilitate

1 the sliding movement of the release cable 24 relative to the
2 lead 10'.

3 As set forth above, the coupling assemblies 16 and/or 28
4 may be similarly structured and, as also set forth above,
5 additional, more preferred embodiments of the coupling
6 assemblies similar to 16 and 28 are shown in detail in Figures
7 6-8. With reference to Figure 5, the coupling assembly 16' may
8 incorporate structural features similar to those shown in
9 Figures 6-8, in which the coupling assembly is referenced by
10 either 16' or 16". With further reference to Figure 4, coupling
11 16 may include a spring biased plunger 51, which when axially
12 disposed inwardly towards an interior portion 53 of the second
13 component 22 will serve to release the one or, preferably, two
14 outwardly extending, oppositely disposed locking members 62 from
15 their normally biased outwardly extending locking orientation.
16 In a preferred embodiment of the present invention, the locking
17 members 62 will comprise an elongated finger configuration as
18 illustrated in Figures 6-8. However, it is anticipated that the
19 present invention may encompass other configurations of locking
20 members 62, including but not limited too, ball bearings, wedge
21 shaped, cone shaped, etc. Release of the locking members 62
22 from their normally biased outwardly extending locking
23 orientation will allow attachment of the first coupling
24 component 18 to the second coupling component 22.

25 For purposes of clarity the structural details of the

1 preferred embodiments of Figure 6-8, are explained with
2 reference to coupling assemblies 16' and 16" as indicated in the
3 aforementioned Figures. It is again to be emphasized that the
4 structural components of the coupling assemblies 16' and 16" may
5 be similarly. One feature of the different embodiments of
6 Figure 6-8 is the ability to accomplish a quick and efficient
7 attachment and release of the components of the respective
8 coupling assemblies 16' and 16", such as while utilizing only a
9 single hand of the user. Further, attachment can be
10 accomplished without the physical depression or other
11 manipulation of the spring biased plunger 51 or any similar
12 component.

13 More specifically, a feature of the embodiment of the
14 coupling assembly 16' of Figure 6 as well as the additional
15 preferred embodiment 16" of Figures 7 and 8 is the inclusion of
16 one or, preferably, two locking members 62 having an outer
17 surface specifically configured to facilitate the quick and
18 efficient attachment or release of the first component 18' to or
19 from the second component 22'. In particular, each of the
20 locking members 62 includes a leading surface portion 65 and a
21 trailing surface portion 67. The locking members 62, as shown
22 in Figure 6, are disposed in their normally biased outwardly
23 extending locking orientation between the first component 18'
24 and the second component 22'. Furthermore, the trailing surface
25 portions 67 of each of the locking members 62 are configured

1 into a transverse, linear shape so as define a stop member which
2 will prevent unwanted detachment of the first and second
3 components 18' and 22' from one another such as when they are
4 pulled away from one another by the strain of the animal or
5 other forces. As such, it is necessary to affirmatively dispose
6 the locking members 62 inwardly into the interior of the first
7 component 18' in order to define a retracted orientation and
8 allow passage of the leading end 64 of component 18' through the
9 receiving aperture as at 69 formed in the second component 22'.

10 Looking in greater detail, the coupling assembly 16'
11 comprises a first component 18' and a second component 22'
12 which, as shown, are respectively configured to define a male
13 coupling component and a female coupling component. At least
14 one, preferably the male coupling component, is preferably
15 structured to rotate or swivel, thereby allowing the entire
16 coupling assembly 16' to be rotatable and swivelable to prevent
17 tangling and the like. As explained above, the first component
18 18' may be connected to the distal or free end of the lead 10
19 and, more specifically, in direct operative attachment to the
20 release structure, which in one preferred embodiment comprises
21 an interior, axially moveable release cable 24. The release
22 cable 24 may be connected directly to a plunger 60 so as to
23 exert an axially directed force thereon which in turn permits
24 the easy release of the first component 18' from the second
25 component 22' by virtue of the fact that an axially directed

1 pulling force will cause the plunger 60 to move outwardly
2 against a force exerted thereon by a biasing spring (not shown).
3 This outward movement of the plunger 60 will in turn cause the
4 locking members 62 to be released from their normally biased
5 outwardly extending locking orientation and pulled into a
6 retracted orientation, thereby allowing the first component 18'
7 to be easily released from the second component 22'.

8 In an alternate embodiment of the coupling assembly 16", as
9 illustrated in Figures 7 and 8, the locking members 62' and the
10 second component 22' may comprise oppositely charged magnetic
11 materials, such that the attractive and/or repulsive magnetic
12 forces are sufficient to maintain the locking members 62' in
13 their normally biased outwardly extending locking orientation.
14 In this embodiment, the plunger 60 is connected to each locking
15 member 62', wherein an outward axial force is required to
16 reposition the locking members 62' from their normally biased
17 outwardly extending locking orientation to the retracted
18 orientation, so as to allow the first component 18' to be easily
19 released from the second component 22'.

20 In yet another embodiment of the coupling assembly 16", the
21 locking members 62' may in whole or in part comprise a
22 magnetically charged material. Additionally, the release
23 structure comprises an electromagnet which replaces the release
24 cable 24 and plunger 60 and generates a stronger, similarly
25 polarized magnetic field relative to the locking members 62'

1 such that the repulsive magnetic forces are sufficient to force
2 the locking members 62' into their normally biased outwardly
3 extending locking orientation. To release the first component
4 18' from the second component 22' in this embodiment of the
5 present invention, an electrical current may be applied to the
6 electromagnet which reverses its polarity, thus causing the
7 locking members 62' to be pulled into a retracted orientation by
8 magnetic attraction which permits the first component 18' to be
9 automatically detached from the second component 22'. In such an
10 embodiment, an independent biasing force on the locking members
11 62 may not be necessary.

12 A further embodiment of the present invention incorporates
13 an electromotive release mechanism 160 comprising an actuation
14 member 162 and being disposed in an operative association with
15 at least one, but preferably a plurality of locking members 62',
16 as shown in Figures 25 through 28. In particular, the operative
17 association is at least partially defined by the electromotive
18 release mechanism 160 being structured to normally dispose the
19 locking members 62' into an outwardly extending locking
20 orientation. The operative association is further defined by
21 the electromotive release mechanism 160 being further structured
22 to selectively dispose the locking members 62' into the
23 retracted orientation, upon actuation of the electromotive
24 release mechanism 160, such that a first component 18' and a
25 corresponding second component 22' of the coupling assembly 16'

1 are detached from one another.

2 More specifically, in at least one preferred embodiment,
3 the actuation member 162 of the electromotive release mechanism
4 160 comprises a distal portion 163 structured to normally
5 dispose the locking members 62' in the outwardly extending
6 locking orientation, such as, for example, via displacement of
7 the locking members 62', as illustrated in Figures 25, 26, and
8 28. Additionally, the distal portion 163 of the actuation
9 member 162 is structured to selectively dispose the locking
10 members 62' in a retracted orientation, thereby permitting the
11 first component 18' and the second component 22' of the coupling
12 assembly 16' to be detached from one another. In the embodiment
13 of Figures 25 and 28, the distal portion 163 of the actuation
14 member 162 is movably disposable between an extended
15 displacement configuration such that the locking members 62' are
16 disposed in the outwardly extending locking orientation, as
17 illustrated in Figures 25A and 28A, and a retracted non-
18 displacement configuration such that the locking members 62' are
19 disposed in the retracted orientation, as illustrated in Figures
20 25B and 28B. In at least one alternate embodiment, the distal
21 portion 163 may comprise a magnetically charged material, such
22 as, by way of example only, an electromagnetic, so as to further
23 facilitate positioning the locking members 62' between the
24 outwardly extending locking orientation and the retracted
25 orientation.

1 In the further embodiment of Figure 26, the distal portion
2 163 is movably disposable between a non-displacement
3 configuration such that the locking members 62' are disposed in
4 the retracted orientation, as illustrated in Figure 26A and a
5 displacement configuration such that the locking members 62' are
6 disposed in the outwardly extending locking orientation, as
7 illustrated in Figure 26B. In this embodiment, the actuation
8 member 162 is structured to rotate about an actuation axis 164,
9 as illustrated in Figure 26C, wherein the required rotation may
10 be accomplished by way of an electromotive release mechanism 160
11 comprising a rotary solenoid.

12 In yet one other embodiment, the electromotive release
13 mechanism 160 may comprise at least one interconnecting member
14 164 disposed between the actuation member 162 and each locking
15 member 62'. As shown in Figures 27A and 27B, the electromotive
16 release mechanism 160 may comprise a plurality of
17 interconnecting members 164, such as a wire or a cable, wherein
18 the interconnecting members 164 are structured to dispose the
19 locking members 62' between the outwardly extending locking
20 orientation and the retracted orientation upon repositioning of
21 the actuation member 162, as illustrated. In at least one
22 embodiment, the interconnecting members 164 comprise a shape
23 memory alloy component structured to dispose the locking members
24 62' from the outwardly extending locking orientation to the
25 retracted orientation upon actuation of the electromotive

1 release mechanism 160. Specifically, actuation of the
2 electromotive release mechanism 160 results in an electrical
3 current being at least temporarily applied to the shape memory
4 alloy component, thereby altering its physical configuration and
5 causing the locking members 62' to be reoriented.

6 The electromotive release mechanism 160 may comprise any
7 one of a number of electrically actuated devices including, by
8 way of example only and in no manner limited to, solenoids,
9 transformers, electromagnets, capacitors, electric motors, shape
10 memory alloy components, magnetic propulsion devices, etc.
11 Looking just at solenoids, the electromotive release mechanism
12 160 may comprise a plunger type solenoid, a hammer type
13 solenoid, a swing solenoid, a rotary solenoid, a tubular type
14 solenoid, etc., and these are only a few of the possible types
15 of solenoids illustrative of those which may be comprised by the
16 electromotive release mechanism 160 of the present invention.
17 As such, it is understood that any electromotive device
18 comprising an actuation member 162 which may effect the
19 disposition of the locking members 62' between the outwardly
20 extending locking orientation and the retracted orientation upon
21 application of an electrical current, may be utilized and are
22 encompassed in the scope of the present invention.

23 To facilitate actuation of the electromotive release
24 mechanism 160, an actuation interface 166 is provided is
25 structured to facilitate selective actuation of the

1 electromotive release mechanism 160, via selective application
2 of an electrical current to the electromotive release mechanism
3 160, as desired by the user. The actuation interface 166 may
4 comprise a direct interconnection to the activation assembly 80
5 or 82 such as, for example, an electrical wire extending along
6 the lead 10 between the rechargeable power supply 81' of the
7 activation assembly 80 or 82 and the electromotive release
8 mechanism 160. As such, a selective activation member 44', as
9 described herein, may be utilized to selectively actuate the
10 electromotive release mechanism 160 via selective application of
11 an electrical current from the rechargeable power supply 81'.

12 In at least one embodiment, the actuation interface 166 is
13 disposed in a communicative relationship with a voice activated
14 control module 110, also as described herein, thereby allowing
15 the electromotive release mechanism 160 to be remotely actuated.
16 One further embodiment of the present invention comprises a
17 manual release mechanism 167 interconnected to the actuation
18 interface 166, as illustrated in Figure 27, the manual release
19 mechanism 167 structured to permit manual actuation of the
20 electromotive release mechanism 160, thereby allowing the first
21 component 18' and the second component 22' to be quickly and
22 easily detached from one another.

23 Also as indicated, a further feature of the present
24 invention is its ability to achieve easy and effective
25 engagement or attachment between the first component 18' and the

1 second component 22'. This attachment is preferably facilitated
2 by virtue of the fact that the leading surface portion 65 of
3 each of the locking members 62 has a substantially convergent
4 configuration which extends outwardly in either a curvilinear or
5 sloped shape. Accordingly, engagement of the leading surface
6 portion 65 with the periphery of the receiving aperture 69 will
7 cause a sliding engagement of the respective locking members 62
8 relative to the periphery of the receiving aperture 69 and
9 thereby cause a forced, inward retraction of the locking members
10 62 to counter their normally biased outwardly extending locking
11 orientation. The leading end 64 of the first component 18' will
12 thereby be allowed to pass through the receiving aperture 69
13 into the engaged and attached position as shown in Figures 6 and
14 8 in a substantially facilitated manner.

15 In order to accomplish such quick and easy attachment of
16 the components 18' and 22' together into the attached position
17 of Figures 6 and 8, the first and second components 18' and 22'
18 should be disposed in predetermined aligned engagement with one
19 another. Such predetermined aligned engagement may be defined
20 by an axial alignment of the first component 18' with the second
21 component 22' as best shown in Figure 7. Once the first and
22 second components 18' and 22' are in the aforementioned axial
23 alignment, forced positioning of these two components 18' and
24 22' towards one another as indicated by directional arrows 70
25 and 71 will cause sliding contact of the leading surface portion

1 65 with the periphery of the receiving aperture 69 resulting in
2 the predetermined aligned engagement of the first and second
3 components 18' and 22'. The cooperatively structured
4 configuration of the first and second components 18' and 22' of
5 the preferred embodiment of the coupling assembly 16' allows the
6 predetermined aligned engagement and attachment of the first and
7 second component 18' and 22' by the user with a single hand.

8 As set forth above in order to accomplish a quick and easy
9 attachment of the components 18' and 22' to one another in the
10 locked position of Figures 6 and 8, the first and second
11 component 18' and 22' are disposed in axial alignment with one
12 another. To further assist the axial alignment of the first and
13 second component 18' and 22', each of the embodiments of Figures
14 6 through 8 also preferably include an attraction assembly 75
15 which facilitates the axial alignment and automatic attachment
16 of the components 18' and 22' to one another. Such an
17 attraction assembly 75 is mounted on the coupling assembly 16'
18 in the form of correspondingly positioned, attractive, mating or
19 engaging surfaces. In the embodiment of illustrated Figure 6,
20 the attraction assembly 75 includes at least the exposed annular
21 surface 72 of the first component 18' being formed of a magnetic
22 material and configured to attract a similar annular surface 74
23 of the second component 22', also formed of a magnetic material.
24 In the locking position of Figure 6, these magnetically
25 attractive surfaces 72 and 74 will normally be brought into

1 confronting engagement with one another. The provision of the
2 magnetically attractive surfaces 72 and 74 and their relative
3 disposition to one another will facilitate the axial alignment
4 of the components 18' and 22' as well as the inwardly directed
5 connecting force indicated by directional arrows 70 and 71 such
6 that the first and second components 18' and 22' are
7 automatically attached. In at least one embodiment, the
8 attraction assembly 75 utilizes magnetic propulsion to achieve
9 automatic attachment of the first and second components 18' and
10 22' by including an array of magnetic surfaces 72 or 74 having
11 alternating polarities, or an array of magnetic surfaces 72 or
12 74 having similar polarities but exhibiting progressively
13 stronger or weaker magnetic forces.

14 In the embodiment of Figure 6, the magnetically attractive
15 surfaces 72 and 74 are substantially externally located when the
16 first and second components 18' and 22' are separated from one
17 another. Conversely the additional preferred embodiment of
18 Figures 7 and 8 includes the magnetically attractive surfaces 78
19 and 79 disposed substantially interiorly but in the respective
20 position of the first component 18' with the second component
21 22' as shown in Figure 8.

22 In addition, the attraction assembly 75 of the embodiment
23 of Figure 8 may also include interior side surfaces as at 82'
24 which are designed to at least partially engage and cause the
25 direct attraction of the locking members 62'. Accordingly, in

1 the embodiment of Figure 8 the locking members 62' are at least
2 partially formed of a magnetically attractive material so as to
3 facilitate the aforementioned predetermined aligned engagement
4 of the first and second components 18' and 22' with one another.
5 Further, the magnetically attractive surfaces may be utilized to
6 cause the first and second components 18' and 22' to
7 automatically engage and attach to one another when disposed in
8 the predetermined aligned relationship.

9 In addition to the ability to achieve easy and effective
10 engagement or attachment of the components of the coupling
11 assembly 16', at least one embodiment of present invention
12 comprises an electromotive propulsion mechanism 170, as
13 illustrated in Figure 28, structured to at least temporarily
14 impart a separation force between the first component 18' and
15 the second component 22'. More in particular, the electromotive
16 propulsion mechanism 170 of the present invention comprises at
17 least one propulsion member 172, however, in one preferred
18 embodiment, the electromotive propulsion mechanism 170 comprises
19 a plurality of propulsion members 172 disposed in a spaced apart
20 relation to one another, as illustrated in Figure 28. The
21 propulsion members 172 preferably comprise an elongated
22 configuration, as illustrated, and are disposed adjacent a
23 propulsion interface 174 formed between abutting portions of the
24 first component 18' and the second component 22' of the coupling
25 assembly 16', as best shown in Figure 28A.

1 The electromotive propulsion mechanism 170 of the present
2 invention is specifically structured to dispose the propulsion
3 members 172 between a secured configuration and a separated
4 configuration. Specifically, the secured configuration is at
5 least partially defined by the propulsion members 172 being
6 disposed in an inwardly retracted position by the electromotive
7 propulsion mechanism 170, as illustrated in Figure 28A.
8 Conversely, the separated configuration is at least partially
9 defined by the propulsion members 172 being disposed in an
10 outwardly extended position by the electromotive propulsion
11 mechanism 170, as illustrated in Figure 28B. The disposition of
12 the propulsion members 172 from the secured configuration to the
13 separated configuration results in a separation force between
14 the first component 18' and the second component 22' of the
15 coupling assembly 16' in a direction substantially normal to the
16 propulsion interface 174, as indicated by directional arrows 176
17 in Figure 28B. The separation force is sufficient to cause the
18 first component 18' and the second component 22' to detach from
19 one another when each of the plurality of locking members 62' is
20 disposed in the retracted orientation.

21 Similar to the electromotive release mechanism 160
22 previously described, the electromotive propulsion mechanism 170
23 of the present invention may comprise any one of a number of
24 electrically actuated devices including, by way of example only
25 and in no manner limited to, solenoids, transformers,

1 electromagnets, capacitors, electric motors, shape memory alloy
2 components, magnetic propulsion devices, etc. As before, it is
3 understood that any electromotive device which may effect the
4 disposition of the propulsion members 172 between the secured
5 configuration and the separated configuration upon application
6 of an electrical current may be utilized and are encompassed in
7 the scope of the present invention.

8 To assure that locking members 62' are disposed in the
9 retracted orientation prior to disposition of the propulsion
10 members 172 into the separated configuration, so as to prevent
11 jamming of the locking members 62' in the interior of the second
12 component 22', at least one embodiment of the present invention
13 comprises a time sequence module. The time sequence module is
14 structured such that actuation of the electromotive release
15 mechanism 160 effecting retraction of the locking members 62'
16 must occur a preselected period of time before the electromotive
17 propulsion mechanism 170 is permitted to operate to dispose the
18 propulsion members 172 into the separated configuration. The
19 preselected period of time is determined by the amount of time
20 required for the locking members 62' to fully retract after
21 actuation of the electromotive release mechanism 160.

22 In at least one embodiment, the electromotive propulsion
23 mechanism 170 may comprise an attraction mechanism, such as, for
24 example, an electromagnet, structured to be actuated by the time
25 sequence module upon disposition of each of the propulsion

1 members 172 from the outwardly extended position into an at
2 least partially inwardly retracted position. Specifically, the
3 disposition of each of the propulsion members 172 into an at
4 least partially inwardly retracted position is indicative of the
5 second component 22' being disposed in proximity to the first
6 component 16' in predetermined aligned engagement, and the
7 attraction mechanism is thus structured to facilitate quick and
8 easy connection of the components of the coupling assembly 16'
9 by imparting an attraction force between the components.

10 A further embodiment of the present invention is
11 illustrated in Figure 29 and includes an electromotive release
12 mechanism 160 having an actuation member 162 comprising a
13 propulsion member 172'. In this embodiment, the electromotive
14 release mechanism 160, more specifically, the actuation member
15 162, is structured to dispose the propulsion member 172' between
16 a secured configuration and a separated configuration via
17 disposition of a distal portion 163 of the actuation member 162
18 between a displacement configuration and a non-displacement
19 configuration, respectively. As shown, the propulsion member
20 172' is structured to extend through a portion of the first
21 component 18' and to contact an inner portion of the second
22 component 22', thereby exerting a separation force in a
23 direction substantially normal to a propulsion interface 174',
24 as indicated by directional arrows 176'. The separation force
25 is sufficient to cause the first component 18' and the second

1 component 22' to detach from one another when each of the
2 plurality of locking members 62' is disposed in the retracted
3 orientation.

4 Further with regard to Figure 1, the present invention
5 comprises the activation assembly 38. The activation assembly
6 38 is preferably, although not necessarily, integrated as part
7 of a handle 40 structured to facilitate holding of the leash
8 assembly during use. The handle 40 preferably includes a
9 generally apertured construction 42 and further defines gripping
10 means 43 dimensioned and configured to facilitate the holding or
11 gripping of the handle 40 by a single hand of a user of the
12 subject leash assembly. One feature of the present invention is
13 the provision of an activation member as at 44 generally in the
14 form of a spring biased push button, which, due to the force
15 exerted thereon by a biasing spring (not shown for purposes of
16 clarity) is preferably normally disposed in an outward position
17 as shown. The activation member 44 is connected directly to a
18 correspondingly positioned end of the release structure or
19 release cable 24. The release cable 24, may be formed of a
20 metallic material or other applicable materials. Regardless of
21 the structural embodiments, release cable 24 should be
22 sufficiently flexible to be rolled upon itself in a stored
23 position or otherwise oriented as generally shown in Figure 5,
24 but should have sufficient structural integrity to be movable
25 axially along its length, within the interior of the lead 10 and

1 relative thereto. Such axial movement may be accomplished by a
2 force exerted by the user of the subject assembly on the
3 activation member or push button 44 as indicated by directional
4 arrow 45.

5 With reference to Figure 4, another preferred embodiment of
6 the present invention comprises basic structural features
7 similar to the embodiment of Figures 1 and with the exception
8 that the lead 10' has a somewhat flat strap like configuration
9 extending along its length. However, at least a portion of the
10 lead 10' defines a hollow interior along the entire length
11 thereof for the positioning and axial movement of the release
12 structure or cable 24. Moreover, as illustrated in Figure 2A,
13 a sheath structure 27 may be disposed within the lead 10'.

14 The activation assembly 38' of the embodiment of Figure 4
15 is associated with a handle structure 40' having a somewhat
16 different configuration than that of the embodiment of Figure 1.
17 More specifically, the handle 40' comprises an open, central
18 aperture construction 42' having a grip 43' designed to
19 facilitate gripping by one hand of the user of the subject
20 assembly. In this embodiment, however, the activation assembly
21 38' comprises an activation member 44' in the form of a trigger
22 type switch positionable for operation by a single finger of the
23 gripping hand of the user of the subject assembly. The
24 activation member 44' is normally biased into its outermost
25 position, as shown in Figure 4, by any type of biasing spring or

1 the like. However, depression or movement of the activation
2 member 44' to an inner position serves to axially move the
3 release structure or cable 24. Such axial movement will exert
4 an outward axial force on the plunger 60 which will serve to
5 release the first component 18 of the coupling assembly 16 from
6 the second component 22. Additional embodiments of the
7 activation assembly are disclosed, such as 80' in Figure 5,
8 which is similar in structure and operation to activation
9 assembly 80, as described hereinafter for the embodiment of
10 Figure 9.

11 An additional structural feature of the embodiment of
12 Figure 4 and in particular the activation assembly 38' is the
13 inclusion of a lock structure indicated as 50. The lock
14 structure 50 may have any applicable or adequate structure
15 secured to handle 40' so as to prevent the depression or inward
16 travel of the activation member 44'. This will prevent the
17 inadvertent detachment of the coupling assembly 16 and eliminate
18 the possibility of accidentally releasing or detaching the animal
19 from the lead 10'.

20 Yet another embodiment of the lead 10" is illustrated in
21 Figure 4A. Specifically, as shown, the lead 10" comprises a
22 fixed composite proximal portion 14" interconnected to the
23 handle 40", and a plurality of free distal ends 12". Each of
24 the plurality of free distal ends 12" further comprising a first
25 component 18" of a coupling assembly 16" structured to

1 interconnect to a second component 22" mounted on or attached to
2 a different one of a plurality of collars, harnesses, or similar
3 attachment assemblies 26, such that a single lead 10" and handle
4 40" may be simultaneously attached to a plurality of animals.
5 Further, in this embodiment, a selective activation member 44"
6 is employed such that the handler may select any one of the
7 plurality of coupling assemblies 16" to be released.

8 One other embodiment of the retractable leash assembly of
9 the present invention is illustrated in Figure 4B. As shown,
10 this embodiment comprises a housing 84' which is structured to
11 facilitate a plurality of leads 10'. More in particular, the
12 housing 84' is structured to permit at least a portion of each
13 of the plurality of leads 10' to pass through at least a portion
14 of the housing 84'. In addition, the housing 84' comprises an
15 activation assembly 80' which preferably includes a drive
16 mechanism, as shown in phantom at 85'. Each of the plurality of
17 leads 10' comprises a proximal portion 14' disposed in an
18 operative relationship with the housing 84', specifically, each
19 proximal portion 14' is interconnected to at least a portion of
20 the drive mechanism 85'. Each of the leads 10' also comprises
21 a distal end 12' each interconnected to a different one of a
22 plurality of first components 18' which are structured and
23 disposed to engage a corresponding one of a plurality of second
24 components 22' (not shown) being mounted on or attached to a
25 different one of a plurality of collars, harnesses, or similar

1 attachment assemblies 26' (not shown).

2 Similar to the embodiment illustrated in Figure 4A, the
3 embodiment of Figure 4B comprises a selective activation member
4 44' structured such that the handler may select any one of the
5 plurality of first components 18' to be released from its
6 corresponding second component 22' (not shown). In addition,
7 the drive mechanism 85' of the embodiment of Figure 4B may be
8 further structured such that the portion of each of the
9 plurality of leads 10' may be released from or retracted into
10 the housing 84' either independently of one another, or
11 simultaneously and in a uniform manner [i.e. substantially
12 similar rates of release or retraction], once again, via the
13 selective activation member 44'. Thus, the embodiment of the
14 retractable leash assembly illustrated in Figure 4B provides the
15 handler with considerable versatility in handling a plurality of
16 animals which may be attached thereto.

17 As illustrated in Figure 4B, the retractable leash assembly
18 may comprise several additional features such as a rechargeable
19 power supply 81' being electrically interconnected to a recharge
20 port 83', the recharge port 83' preferably structured to accept
21 a standard household power source in order to recharge the
22 rechargeable power supply 81'. In at least one preferred
23 embodiment, the rechargeable power supply 81' comprises a
24 rechargeable battery pack.

25 Additionally, the embodiment of Figure 4B illustrates the

1 drive mechanism 85' further comprising a drive motor, shown in
2 phantom at 88', and a voice activated control module 110'
3 disposed in a communicative association with the drive motor
4 88'. More in particular, such communicative association is at
5 least partially defined by the drive motor 88' operating to
6 retract the portion of at least one of the plurality of leads
7 10' into the housing 84' or to release the portion of the lead
8 10' from the housing 84' upon delivery of a verbal command from
9 the user to the voice activated control module 110'. In one
10 preferred embodiment, the communicative association is further
11 defined by the drive motor 88' operating to retract the portion
12 of each of the plurality of leads 10' into the housing 84' or to
13 release the portion of each of the plurality of the leads 10'
14 from the housing 84' upon delivery of a verbal command from the
15 user to the voice activated control module 110', wherein the
16 leads may be released and/or retracted either independently or
17 simultaneously in a uniform manner.

18 Yet one further embodiment of the retractable leash
19 assembly may comprise a housing 84' constructed of a clear or
20 otherwise light transmissive material and including an internal
21 illumination source, such as one or more light emitting diodes
22 116', which may be activated under low light conditions thus
23 providing a safety advantage to the handler, so that they may be
24 seen by others, for example, automobile drivers, while utilizing
25 the device at night. This embodiment may also comprise one or

1 more leads 10' also being constructed of a clear or otherwise
2 light transmissive material, such that the light emitting
3 diode(s) 116' may also act to illuminate at least a portion of
4 the leads(s) 10' thereby providing an additional safety feature
5 to the handler, as well as to the animal attached thereto.

6 With regard to Figure 3, an alternate embodiment is
7 disclosed wherein the second component indicated as 22" is
8 fixedly mounted on an exterior surface of the attachment
9 assembly 26. The structural features of the second component
10 22" are similar to that of the second component 22 of Figure 1
11 in that it is designed to removably receive the first component
12 18 therein.

13 Additional preferred embodiments of the present invention
14 are shown in Figure 9, and Figures 10 and 11, and relate to an
15 activation assembly generally indicated as at 80 or 82,
16 respectively. With regard to the embodiment of Figure 9, the
17 activation assembly 80 includes a housing 84 having an at least
18 partially hollow interior for the mounting and enclosure of a
19 drive mechanism 85 structured such that the proximal end of the
20 lead 10 may be connected to a portion thereof. In at least one
21 embodiment, the drive mechanism 85 comprising at least a storage
22 or take-up spool indicated in phantom lines as 86. The take-up
23 spool 86 is rotationally mounted on the interior of the housing
24 84 and, more specifically, is operated by the drive mechanism 85
25 which may further include a drive motor, such as is

1 schematically represented in phantom line as 88. The drive
2 motor 88 is preferably electrically powered and is specifically
3 structured to be reversible so as to rotate the take-up spool 86
4 in opposite directions. The opposite directions of rotation of
5 the drive motor 88 serve to either retract or release the lead
6 10 thereby allowing complete control over a tethered animal
7 attached to the distal or free end of the lead 10. By virtue of
8 the drive mechanism 85 comprising the drive motor 88 and the
9 take-up spool 86, a user or handler of the subject leash
10 assembly is allowed to avoid the disadvantages associated with
11 spring driven, retraction structures of the type typically found
12 in conventional retractable leash assemblies. The drive
13 mechanism 85 may also utilize magnetic propulsion, as described
14 above, to further facilitate the release and/or retraction of
15 the lead 10 by the drive mechanism 85.

16 In one preferred embodiment, the activation assembly 80
17 further comprises a release control mechanism structured to
18 regulate the rate of release of the lead 10 from the housing 84
19 of the activation assembly 80, upon detection of a predetermined
20 condition or control set point. More specifically, the release
21 control mechanism is structured to either substantially stop the
22 release of the lead 10 from the housing 84, or to attenuate the
23 rate of release of the lead 10. The predetermined condition or
24 set point may include a particular velocity of release of the
25 lead 10 from the housing 84, or a particular acceleration of the

1 release of the lead 10 from the housing 84. In at least one
2 embodiment, the release control mechanism is structured to
3 cooperatively associate with the drive mechanism 85 to either
4 substantially stop or attenuate the release of the lead 10 from
5 the housing 84. In order to facilitate attenuation of the
6 release of the lead 10, the release control mechanism may
7 incorporate a computerized time delay program which allows the
8 handler to preselect a degree of attenuation for the rate of
9 release of the lead 10 from the housing 84 as appropriate, based
10 upon the size of the animal being controlled with the leash
11 assembly. Additionally, the computer program also being
12 structured to control the velocity of the drive motor 88, in
13 accordance with the preselected degree of attenuation, upon
14 detection of the predetermined condition.

15 Further with regard to the embodiment of Figure 9 the
16 housing 84 includes a handle structure generally indicated as 89
17 which may be dimensioned and configured to have a hollow
18 interior so as to house an electrical power supply used to
19 energize at least the drive motor 88. Such an electrical power
20 supply of course may be in the form of a rechargeable direct
21 current battery pack, or another type of rechargeable power
22 supply such as, by way of example, a solar power supply having
23 storage capabilities, structured to supply sufficient power to
24 operate the drive motor 88. The housing 84 may also include a
25 recharge port as at 83 to permit interconnection of the

1 rechargeable direct current battery pack to a source of power,
2 such as via a standard household current power source. It should
3 also be noted that the overall configuration of the housing 84
4 could be such as to include an apertured configuration as at 96
5 which along with the dimension and configuration of the battery
6 casing segment of the handle structure 89 may form a handle or
7 grip to facilitate carrying or manipulation of the activation
8 assembly 80.

9 The activation assembly 80 or 82 further comprises a
10 switching assembly, generally indicated as 90, wherein one or
11 more switches as at 92 may be used to operate the drive motor 88
12 or 88' and an additional one or two switches as at 94 are used
13 to axially move the aforementioned release cable 24 so as to
14 cause the release of components 18 and 22 of the coupling
15 assembly 16. Alternatively, the activation assembly 80 or 82
16 may incorporate a voice activated control module 110 including
17 an audio receiver 112 disposed in a communicative relationship
18 with an integrated computerized circuit board 114 which controls
19 the operation of the drive motor 88 or 88', thereby controlling
20 either the retraction or release the lead 10, based upon a
21 verbal command from the handler to the voice activated control
22 module 110, via the audio receiver 112. In addition, the voice
23 activated control module 110 may also be utilized to control the
24 release cable 24 or other release mechanism upon verbal command
25 of the handler. In yet another embodiment of the present

1 invention, the coupling assembly 16 or 28 may comprise a voice
2 activated control module 110, wherein the coupling assembly 16
3 or 28 is structured to release the first component 18 or 29 from
4 the second component 22 or 30, respectively, based upon a verbal
5 command from the handler to the audio receiver 112.

6 In at least one embodiment, the voice activated control
7 module 110 further comprises an audio transmitter, for example,
8 an audio speaker in combination with the audio receiver 112,
9 such that the handler may remotely convey verbal or other
10 audible signals to the animal or animals being restrained by the
11 leash assembly. The audio transmitter may be mounted to the
12 activation assembly 80 or 82, or, in at least one embodiment,
13 the audio transmitter may be mounted directly to the coupling
14 assembly 16. Additionally, the verbal or other audible signal
15 may be preprogrammed such that the handler may convey the
16 desired verbal or other audible signal to the animal by merely
17 selecting the desired preprogrammed command, such as, via a
18 keypad located on the activation assembly 80 or 82, or on a
19 remote transmitter structured to communicate with the voice
20 activated module 110.

21 With regard to the additional preferred embodiment of
22 Figures 10 and 11, the activation assembly 82 comprises a
23 housing as at 100 having a substantially hollow interior
24 configuration for the mounting of a drive motor 88' and a
25 storage or take-up spool generally indicated as 102. The take-

1 up spool 102 may have a spiral configuration which stores the
2 lead 10 about the length of the take-up spool 102 wherein a
3 cushioning spring as at 104 is provided to cushion the movement
4 of the lead 10 into and out of the housing 100. Again, the
5 drive motor 88' is structured to be reversible so as to
6 selectively accomplish both retraction and release of the lead
7 10 relative to the take-up spool 102. A switching assembly
8 generally indicated as at 90 is also mounted on the housing 100
9 operatively associated with the drive motor 88' and to the
10 release structure in the form of release cable 24 as explained
11 above. As indicated above with reference to the embodiment of
12 Figure 9, the drive motor 88' may incorporate the voice
13 activated control module 110 to control the drive motor 88' to
14 retract or release the lead 10 and/or to control the release
15 cable 24 or other release mechanism, based upon the particular
16 verbal command from the handler. A separable casing segment 105
17 may be provided to enclose and secure a rechargeable battery
18 therein, wherein the entire casing 105 and the battery mounted
19 on the interior thereof may be removed from the remainder of the
20 housing 100 for purposes of recharging or replacing.

21 Of course, however, in either of the embodiments comprising
22 a drive mechanism 85, the drive motor 88 or 88' may be
23 configured to only manipulate the release cable 24, with the
24 lead 10 itself being either of a fixed length or retractable.
25 For example, in an embodiment with a long lead 10 or wherein the

1 lead 10 is substantially wound in a stored orientation, a
2 greater force may be required to actuate the release cable 24.
3 As such, the drive motor could be used solely for the release
4 cable 24. Additionally, whether the drive motor 88 provides for
5 powered movement of the lead 10 and/or the release cable 24, a
6 one way drive motor could also be effectively employed so long
7 as an automatically or affirmatively releasing engagement with
8 the retracted lead 10 is achieved. For example, if the lead 10
9 is retracted by the drive motor 88 or 88' a similar release as
10 to that which is normally provided to release an inward spring
11 bias can be employed to allow the lead 10 to be released without
12 causing or requiring a reversal of the drive motor 88 or 88'.
13 Also, as to the release cable 24, only a momentary axial force
14 applied to the release cable 24 is required to release the first
15 component 18 from the second component 22. As such, the drive
16 motor 88 or 88' could be configured to pull on the release cable
17 24 a limited amount of time, after which it may automatically
18 back out after which a normal bias on the release cable 24 can
19 cause a clutch type release.

20 Another embodiment of the activation assembly 80 or 82 may
21 include the electrical power supply operatively associated with
22 the electromagnet of the alternative embodiment of the release
23 structure 24 presented above. The activation assembly 80 or 82
24 operates by providing sufficient electrical current to the
25 electromagnet to reverse its polarity such that it exhibits

1 either attractive or repulsive magnetic forces relative to the
2 locking members 62. The attractive or repulsive magnetic forces
3 may cause the locking members 62 to be repositioned from their
4 normally biased outwardly extending locking orientation into
5 their retracted orientation, thereby permitting the first and
6 second components 18' and 22' to be easily released from one
7 another. Alternatively, the attractive or repulsive magnetic
8 forces may cause the locking members 62 to be repositioned from
9 their retracted orientation into their normally biased outwardly
10 extending locking orientation, thereby securing the first and
11 second components 18' and 22' to one another.

12 In yet another embodiment, the locking members 62 may
13 comprise a shape memory alloy structured to deform from a
14 normally biased outwardly extending locking orientation to a
15 retracted orientation, upon application of an electrical
16 current, thereby permitting the first and second components 18'
17 and 22' to be easily released from one another. Alternatively,
18 the release cable 24 or other release structure may comprise a
19 shape memory alloy structured to deform, once again, upon
20 application of an electrical current, thereby causing the
21 locking members 62 to be repositioned from a normally biased
22 outwardly extending locking orientation to a retracted
23 orientation, thus allowing the first and second components 18'
24 and 22' to be released from one another.

25 As previously described, the switching assembly 90 may be

1 employed to activate the electrical current to the electromagnet
2 when quick and easy release of the first and second components
3 18' and 22' is desired. In at least one embodiment of the
4 present invention, the switching assembly 90 comprises part of
5 an electrical circuit which directly applies the electrical
6 current to the electromagnet, while in at least one other
7 embodiment, the switching assembly 90 utilizes a fiber optic
8 circuit which indirectly causes the electrical current to be
9 applied to the electromagnet. The switching assembly 90 may
10 further be structured so as to permit the handler to transmit a
11 small electrical impulse to the attachment assembly worn by the
12 animal, thereby directing a small electrical shock, vibration,
13 or other electrical stimulation to the animal, such as have been
14 proven to be an effective training tool. In a preferred
15 embodiment, the handler can selectively adjust the magnitude of
16 the electrical impulse to suit the size and temperament of the
17 animal being trained.

18 Each of the embodiments of the activation assembly 80 or 82
19 comprising the drive mechanism 85 as presented herein may
20 additionally comprise a radio or other remote signal receiver
21 structured to activate or deactivate the drive mechanism 85
22 and/or the release cable 24 or other release mechanism from a
23 remote location via a radio transmitter. In this embodiment, a
24 receiver may be operatively connected to the activation assembly
25 80 or 82, which is structured to receive predetermined signal(s)

1 from a remotely located radio transmitter, or other remote
2 signal transmitter. Once the transmitted signal is received,
3 the receiver triggers the switch assembly 90 such that the
4 activation assembly 80 or 82 causes the drive motor 88 or 88' to
5 operate and retract or release the lead 10, and/or such as to
6 cause the release structure 24 to release the first and second
7 components 18' and 22' from one another.

8 One other embodiment of the activation assembly 80 of the
9 present invention comprises a lead aligning mechanism, generally
10 shown as 120 in Figures 12 through 17. The lead aligning
11 mechanism 120 is structured to maintain the lead 10 in an
12 aligned position relative to the housing 84 of the activation
13 assembly 80 as the lead 10 is retracted into or released from
14 the housing 84. More specifically, the aligned position is at
15 least partially defined when the lead 10 is positioned relative
16 to the housing 84 so as to minimize the potential for binding or
17 other restriction of movement of the lead 10 either into or from
18 the housing 84, such as, for example, when the lead 10 forms an
19 angle of approximately ninety (90) degrees with the housing at
20 its point of entry. The minimization of binding or other
21 restriction of the lead 10 into and out of the housing provides
22 the handler with greater control over the animal being
23 restrained by the leash assembly.

24 In one embodiment, as illustrated in Figures 12 through 16,
25 the lead aligning mechanism 120 is movable along at least a

1 portion of the housing 84 in an arcuate path about a central
2 axis 87, and in at least one embodiment, the lead aligning
3 mechanism 120 comprises a moveable grip member 130.
4 Specifically, the movable grip member 130 is structured and
5 disposed to moveably engage a grip member track, such as, by way
6 of example only, an external grip member track 132, as
7 illustrated in Figures 12 through 14. In another embodiment,
8 the grip member track may comprise an internal grip member track
9 133, as illustrated in Figures 15 and 16. The degree of
10 movement of the moveable grip member 130 is limited by grip
11 member track stops 135, positioned at each end of the grip
12 member track 132 or 133, when either end of the moveable grip
13 member 136 contacts either grip member track stop 135. It is
14 understood that as the distance between the animal and the
15 handler holding the activation assembly 80 increases and
16 decreases, the angle formed between the lead and the activation
17 assembly 80 also increases and decreases, respectively.
18 However, by virtue of the lead aligning mechanism 120 being
19 moveable, and more specifically, the moveable grip member 130
20 being rotatable along at least a portion of the housing 84 about
21 the central axis 87, it is also understood that the lead 10 is
22 maintained in a substantially normal orientation relative to the
23 housing 84. Thus, the lead aligning mechanism 120 minimizes the
24 potential for binding or other restriction of movement of the
25 lead 10 into or from the housing 84, without requiring the

1 handler to adjust or reposition of the housing 84 of the
2 activation assembly 80 relative to the lead 10.

3 Another embodiment of the lead aligning mechanism 120 is
4 illustrated in Figures 17 and 18. In this embodiment, the lead
5 aligning mechanism 120 comprises a movable slide member 140,
6 which is also structured to be movable along at least a portion
7 of the housing 84 of the activation assembly 80 along an arcuate
8 path about the central axis 87. As illustrated in the figures,
9 the movable slide member 140 comprises a slide slot 142
10 structured to permit at least a portion of lead 10 to pass
11 therethrough into and out of the housing 84 of the activation
12 assembly 80. The lead aligning mechanism 120, in this
13 embodiment, comprises a slide member track 144 which may be
14 mounted along an exterior portion of the housing 84, as
15 illustrated in Figure 17. However, it is understood that the
16 slide member track 144 could be disposed along the interior of
17 the housing 84 in a similar manner as the internal grip member
18 track 133, as illustrated in Figures 15 and 16. Further, in
19 this embodiment, the housing 84 comprises a lead receiving
20 channel 146 which is positioned substantially along the path of
21 the slide member track 144, the lead receiving channel 146 being
22 wide enough to permit the lead 10 to freely pass therethrough
23 into the housing 84 regardless of the position of the moveable
24 slide member 140 along the slide member track 144. Each end 147
25 of the lead receiving channel 146 may serve to limit the degree

1 of movement of the moveable slide member 140 along the path of
2 the slide member track 144, similar to the grip member track
3 stops 135, or alternatively, one or more slide member track
4 stops 148 may be employed.

5 In yet another embodiment, the lead aligning mechanism 120
6 may comprise a guide member 150, as illustrated in Figures 19
7 and 20. The guide member 150, as shown, comprises a generally
8 spherical configuration and is structured to be moveably secured
9 within a guide seat 152, which is preferably disposed about a
10 circumference of the guide member 150 and connected to the
11 housing 84 of the activation assembly 80. In particular, the
12 guide member 150 is structured to rotate freely about a guide
13 axis 154 in any direction or path, as illustrated by the
14 directional arrows in Figure 20, over a surface comprising
15 substantially a hemisphere of the guide member 150 which is
16 extending outwardly from the housing 84. The guide member 150
17 comprises a guide channel 156 disposed substantially along the
18 guide axis 154 and structured to permit the lead 10 to pass
19 therethrough into and out of the housing 84. It is understood
20 from the figures that the lead aligning mechanism 120 comprising
21 the guide member 150 provides the greatest range of lead
22 alignment by virtue of the fact that the guide member 150 is
23 structured to permit the lead 10 to move from side to side as
24 well as up and down relative to the housing 84 of the activation
25 assembly 80.

1 In the embodiment of the activation assembly 80 illustrated
2 in Figure 22, the portion of the housing 84 to which the guide
3 member 150 is connected comprises a wide configuration to
4 facilitate a larger directional range of movement of the lead
5 10, for example, from side to side and up and down relative to
6 the housing 84.

7 Figure 23 illustrates yet another embodiment of the
8 activation assembly 80 wherein the housing 84 comprises a
9 generally spherical configuration. In this embodiment, the
10 take-up spool 86 is structured such that the lead 10 also
11 comprises a substantially spherical configuration within the
12 housing 84, as it is wound onto the take-up spool 86.

13 Yet another embodiment of an activation assembly 80 is
14 illustrated in Figure 24. In particular, the embodiment of
15 Figure 24 illustrates the activation assembly comprising a
16 composite lead aligning mechanism 120'. As shown in the figure,
17 the composite lead aligning mechanism 120' comprises a moveable
18 grip member 130, similar to the embodiment of Figures 15 and 16,
19 and a guide member 150, as illustrated in Figures 19, 20, 22,
20 and 23. The composite lead aligning mechanism 120' allows the
21 lead to move freely in both arcuate and rotational directions
22 relative to the housing 84 of the activation assembly 80.

23 Since many modifications, variations and changes in detail
24 can be made to the described preferred embodiment of the
25 invention, it is intended that all matters in the foregoing

1 description and shown in the accompanying drawings be
2 interpreted as illustrative and not in a limiting sense. Thus,
3 the scope of the invention should be determined by the appended
4 claims and their legal equivalents.

5 Now that the invention has been described,